DOCUMENT RESUME

ED 287 682 SE 048 636

TITLE	Sands of Change: Why Land Becomes Desert and What Can Be Done about It. UNEP Environment Brief No. 2.
INSTITUTION	United Nations Environment Programme, Nairobi (Kenya).
PUB DATE	[87]
NOTE	9p.; Color charts and portions printed in color may not reproduce well.
AVAILABLE FROM	United Nations Environment Programme, P.O. Box 30552, Nairobi, Kenya.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Climate; Conservation (Environment); *Depleted Resources; *Developing Nations; *Ecological Factors; *Environmental Education; Environmental Influences; Foreign Countries; Global Approach; International Cooperation; International Organizations; Natural Resources; Socioeconomic Influences; Socioeconomic Status; *Soil Conservation
IDENTIFIERS	*Desertification

ABSTRACT

Poor land and environmental pressures are degrading many of the world's dryland areas. Despite international efforts to halt desertification, the problem is worsening; one-third of the earth's land area, and as many as 850 million of the world's poorest people, are potentially at risk. Presented are some of the key facts and possible solutions to this problem. The discussion considers: (1) the causes of desertification (stressing that the land being affected is deteriorating from within); (2) the areas at risk (outlining regions in various continents that are at moderate to high risk, or are already deserts); (3) the populations of people who are affected (mainly those living in low income developing countries who can least afford it); (4) the costs of desertification (using the Sahel region as an example); (5) what can be done (encouraging the involvement of non-governmental organizations); and (6) how the United Nations Environment Programme (UNEP) is helping. A bibliography is included. (TW)

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UNITED NATIONS ENVIRONMENT PROGRAMME

UNEP Environment Brief No 2

ED287682

sands of change:

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why land becomes desert and what can be done about it

Poor land management and environmental pressures are degrading many of the world's dryland areas. Despite international efforts to halt desertification, the problem is worsening: one-third of the Earth's land area, and as many as 850 million of the world's poorest people, are potentially at risk.

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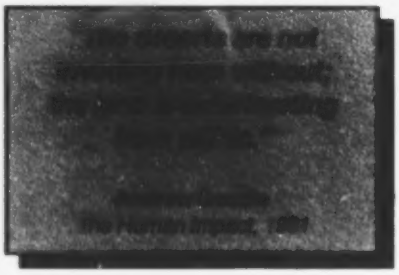
The causes of desertification

Desertification affects mainly the arid and semi-arid areas of the Earth; but though it may be accelerated by drought, it is rarely caused by it. On the contrary, its causes are man-made.

Desertification is a symptom of the disease of under-development. It results from the combination of social and economic factors, such as poverty and the inequitable distribution of resources, with environmental issues such as inappropriate land use systems and farming methods.

Desertification can be triggered by many factors, including overgrazing, deforestation, the expansion of intensive cash cropping onto marginal land more suitable for pastoralism, poor management of boreholes to water stock, and the settling of previously nomadic peoples.

Droughts accelerate desertification and amplify its effects. The Sahel, for example, has undergone at least four major droughts in this century: during 1910-15, 1944-48, 1968-73 and, most recently, 1982-84. Though the severity of these droughts may have been comparable, their effects were not. The last two caused widespread loss of life– in both human and animal populations– mainly because conditions had already deteriorated to a potentially dangerous stage. The most recent drought caused food shortages in more



than 20 African countries, and affected over 150 million people.

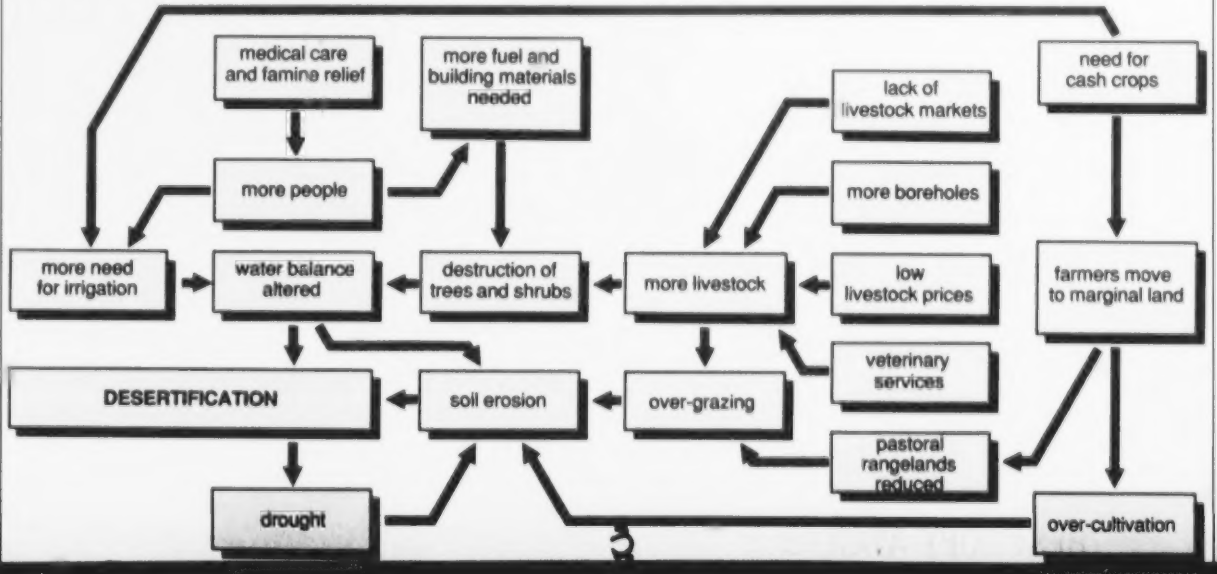
Desertification also tends to occur more commonly in semi-arid than in arid areas. Where rainfall is at least moderately reliable, the temptation to grow more is higher; and when ground cover begins to disappear, rains may be heavy and frequent enough to do real damage to the exposed topsoil.

Desertified land can recover. Providing enough good soil remains in place, and providing that local climates have not been changed too radically, the land will recover slowly once the pressures to which it was subjected are removed. However, recovery can be so slow that the damage is, in effect, irreversible. In southern Tunisia, the tracks of World War 2 tanks and wheeled vehicles can still be seen in the sand, and vegetation has never returned to the area even though grazing pressure is very low and there have been several periods of above-average rainfall since the war.

Desertification can appear in several guises. These include encroaching dunes and sand sheets; deteriorating croplands and rangelands; waterlogging and salinization of irrigated land; destruction of trees and shrubs; and deterioration in either the quantity or the quality of ground and surface water.

Desertification commonly follows deforestation because water runs off the bared hills too quickly, carrying much of the top soil with it and causing major disturbances in the water balance. One result of this is that groundwater sources are now failing all along the foothills of the Himalayas.

Desertification: the causes are complex



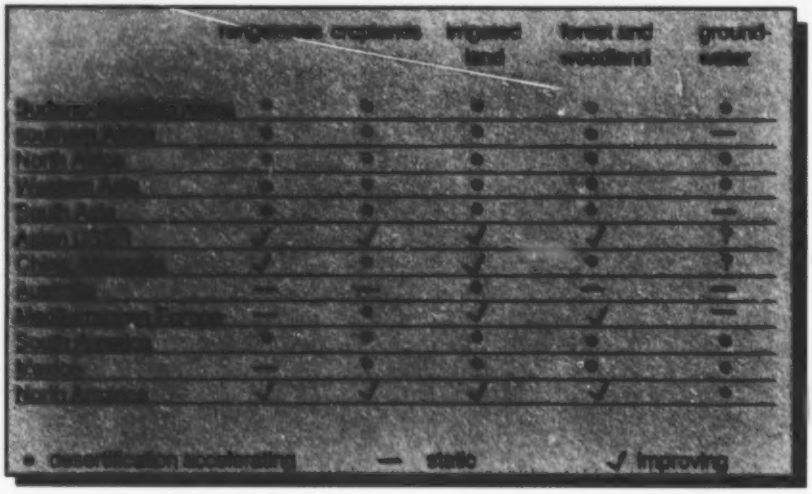
The areas at risk

Desertification threatens the world's dry lands, which constitute about 35 percent of total land area. In spite of their name, the dry lands support some 850 million people and produce substantial quantities of meat, cereals, fibres and hides.

About three-quarters of the dry lands are already desertified to some degree. While much of Africa is severely affected, so too are many other areas: much of South America, India, western Asia, Australia and even some of Mediterranean Europe and North America.

A World Map of Desertification was prepared at the time of the United Nations Conference on Desertification (1977). It showed that 2 percent of Europe, 19 percent of America, 31 percent of Asia, 34 percent of Africa and 75 percent of Australia were at risk from desertification. Highest risk areas include parts of California, Chile, Argentina, north-east Brazil, large areas of Africa, Iraq, Pakistan, and parts of Turkey, Spain and north-west Australia.

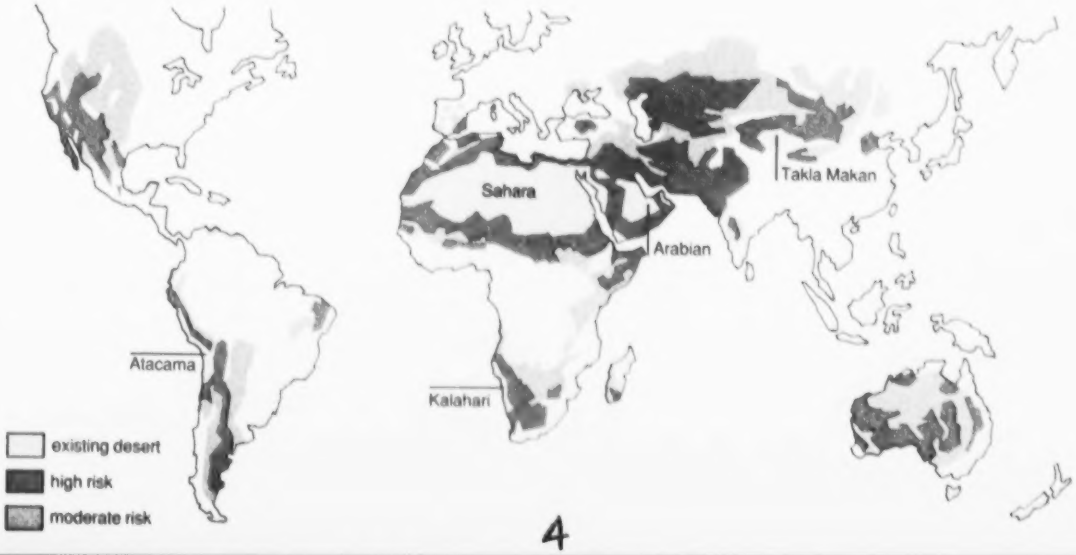
Although desertification can start almost anywhere, fertile land near the edges of existing deserts is often at particularly high risk. Aerial surveys over the Sudan, for example, have revealed that the edge of the Sahara, as marked by the disappearance of sub-desert scrub and grassland, moved southwards about 100 km between 1958 and 1975.


rangeland cropland irrigated land forest and woodland groundwater
• desertification accelerating — static ✓ improving

One of the commonest causes of desertification is now the salinization of irrigated land. Nearly as much land is currently being lost to waterlogging and salinization as is being newly irrigated. Unless new irrigation projects pay careful attention to drainage, many will ultimately suffer from salinity, just as happened in many of the great civilizations of the past.

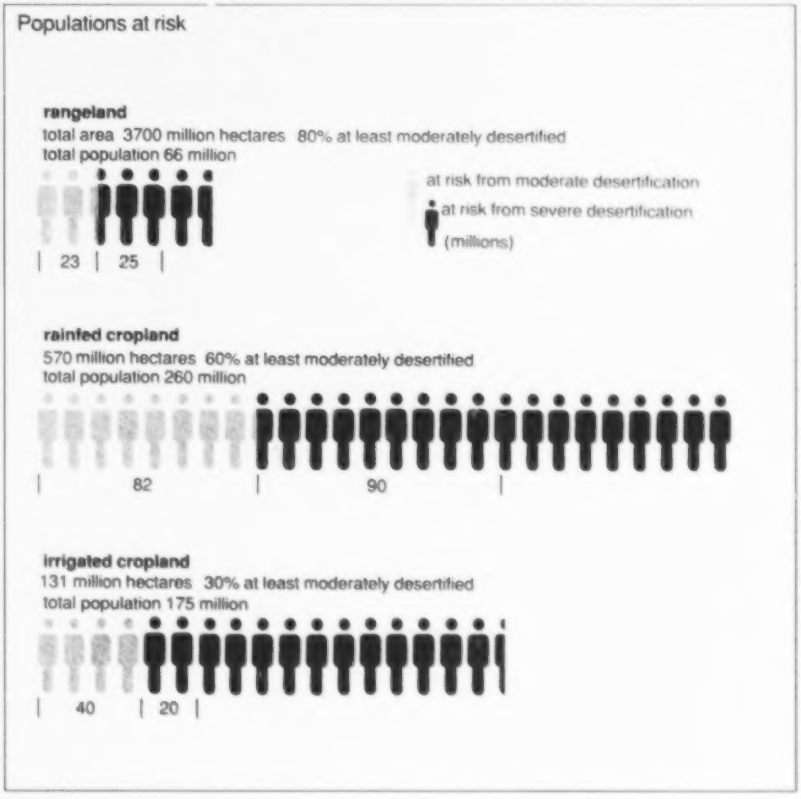
Desertification played a role in the downfall of the Sumerian, Babylonian, Harappan and Roman civilizations, and salinization was involved wherever irrigation flourished. In what is modern day Iraq, irrigation has produced three periods of very rapid population increase; twice, in 1800 BC and 900 AD, populations subsequently crashed as a result of waterlogging and salinization.

Areas threatened by desertification



Who is affected ...

One of the tragedies of desertification is that it affects mainly those who can least afford it: people living in low-income developing countries, particularly in areas that are already climatically, geographically and economically disadvantaged. Because agriculture in these countries is the principal source of jobs, income and GNP, the effects of desertification are often disastrous, leading to famine and political turmoil. Following the drought of the early 1970s, every government fell in the affected Sahel countries.



The numbers keep growing

The population at risk is very large. Some 850 million people live in the world's dry lands, and about 500 million of them are rural dwellers. More than half of them are already affected by at least moderate desertification and 135 million of them are affected by severe desertification.

The rangelands are the worst affected of dry-land areas, with 80 percent of the total of 3700 million hectares already suffering from desertification. However, the rangelands support a rural population of only about 66 million people.

By contrast, 260 million rural people live on rainfed cropland and 175 million on irrigated cropland. Some 60 percent of rainfed cropland, and 30 percent of irrigated cropland, is now at least moderately affected by desertification.

The numbers of people affected have grown rapidly since 1977, partly because populations themselves have grown, and partly because increasingly large areas of the sub-humid tropics (as distinct from the arid and semi-arid areas) are now becoming desertified.

Most of the growth has occurred in the developing countries. It is estimated that 80 percent of the people affected by moderate desertification, and 85 percent of those affected by severe desertification, live in developing regions.

By the year 2000, things are likely to be considerably worse (the goal of halting desertification by that date was suggested during the 1977 UN conference but is now considered impossible to achieve). By then, the population of the dry lands will have increased from 850 to nearly 1200 million, and the rural population from 500 to 600 million. All of the latter increase will be in developing regions, most of it in sub-Saharan Africa.

Desertification is likely to continue unchanged in the rangelands, though improved drainage and other measures could slow the rate of desertification down, if only marginally, on the irrigated croplands. In the rainfed croplands, however, substantial further deterioration is expected as desertification accelerates.

The areas most at risk by the end of the century are likely to be the tropical rainfed croplands of sub-Saharan Africa, Andean South America, and parts of South Asia such as Nepal.

... and the effects worsen

What effects does desertification have on its victims? Those affected are mainly the rural poor. With small incomes, little or no land and scant political power, survival depends on the success of a few crops or the sale of a few animals. As productivity falls, extraordinary measures may have to be taken to survive. In the Peruvian Sierra, where the cold desert is arriving following massive deforestation, houses are now heated only when food is being cooked, and workers must survive with only one cooked meal a day.

As crops fail, domestic animals die, water sources dry up and fuelwood becomes more and more difficult to obtain, the prospects for survival dwindle. Often, they do so slowly, almost imperceptibly. Nutritious grasses are gradually replaced by less palatable ones, forcing livestock to search larger areas for their food; farmers are forced to move onto steep hillside land or areas previously considered too infertile to warrant cultivation. Water sources become polluted with silt and salt. And the tree products on which rural families throughout the developing world depend– for everything from food and fuel to rope, medicines and dyes– become virtually unobtainable. This is the way the wasteland spreads: as T. S. Eliot put it, "not with a bang but a whimper".

People living on the desert fringes are used to hardship; over

... and with what results

the centuries, they have evolved elaborate mechanisms for coping with their harsh environment. Nomadic pastoralists in the Sahel have learned to increase their stock during wetter periods as an insurance against the drought.

But when over-cultivation and over-grazing lead to permanent and increasing losses in yield, traditional means of dealing with crisis fail. The quality of life, already low, deteriorates further. Life becomes little more than a form of chronic disaster.

The typical chain of events that occurs starts with crop yields falling and animals dying from lack of fodder. Industries based on crop and animal products then begin to fail, unemployment rises and people get poorer. Food production falls, food imports rise, and economic chaos ensues. Governments often fall.

Desertification produced dramatic results in the mid-western United States during the Dust Bowl of the 1930s. It is now producing even more dramatic results, in Africa, Asia and Latin America.

For those directly affected, there is in the end only one choice: to move.

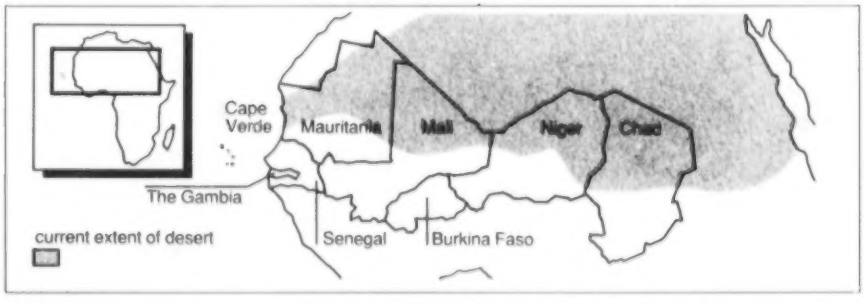
Migration to cities and other countries is a common result of

desertification; during the Sahel drought of the early 1970s, nearly one million 'environmental refugees', a sixth of the population, fled from Burkino Faso (then Upper Volta). Half a million more fled from nearby Mali. The victims of desertification in central America and Haiti fill the cities of the United States; in India, they swell the already teeming cities of the Punjab; and in Brazil, where in the north-east of the country desertification threatens an area the size of western Europe, they flock to already over-crowded cities such as Rio de Janeiro and Sao Paulo.

The Sahel

World attention was first focussed on desertification following the drought in the Sahel in the early 1970s, when between 50,000 and 250,000 people, and about 3.5 million head of livestock, perished. Since then, another drought (1982-84) has reduced stock numbers yet again.

Since 1977, desertification has worsened over much of the Sahel, particularly in Chad, Mali, Mauritania, the Niger and Senegal,even though about US $200 million have been spent on reforestation. On the other hand, projects with more specific objectives, such as sand dune stabilization, have been more successful.



The area is one of the poorest in the world, with per caput incomes of less than US $400 a year, literacy levels of less than 25 percent and life expectancy everywhere below 50 years. Most Sahel countries have large debts and suffer severe shortages of foreign exchange. Populations are increasing by 2-3 percent annually, and there is widespread migration to the cities, particularly the capitals, some of which are growing at more than 7 percent annually. By the year 2000, six of the Sahel countries—Chad, Mali, Mauritania, the Niger, Senegal and Burkina Faso— are expected to have an urban population of 11.8 million, a 224 percent increase over 1975.

What can be done

Because desertification is caused by human action, it can be controlled and cured by human action. And, technically, the solutions are not difficult.

The basic answer is improved forms of land use: better farming systems, an end to over-grazing and over-cropping, sand dune fixation, the erection of wind-breaks and shelter belts, reforestation, and improved soil and water conservation.

At the local level, there have been many successes using these techniques over the past few years. Green belts have been planted round some of the Sahel's capital cities, such as Ouagadougou and Niamey. Algeria has reforested more than 250 000 hectares. Ethiopia has terraced eroded land on 35 watersheds in the central highland plateau. Sudan is restocking its gum belt, Rajasthan is planting roadside shelter belts and Peru has begun an enormous reforestation programme to save some of its Andean Sierra. China has been reforesting at the rate of 1.5 million hectares a year. Wind-breaks have been successfully established in Niger's Majia valley. And while rangeland programmes have been conspicuously less successful, one in Syria has managed to restore productivity to the country's steppes, raising its sheep population from 2.9 million in 1960 to 8.8 million in 1980. The Republic of Korea, India and Nepal have demonstrated that social forestry programmes– operated by the villagers themselves– can be successful: land can be reclaimed, trees planted, and fuelwood and fruit supplies restored, providing valuable income to hill dwellers whose livelihood had been destroyed by bad land-use management.

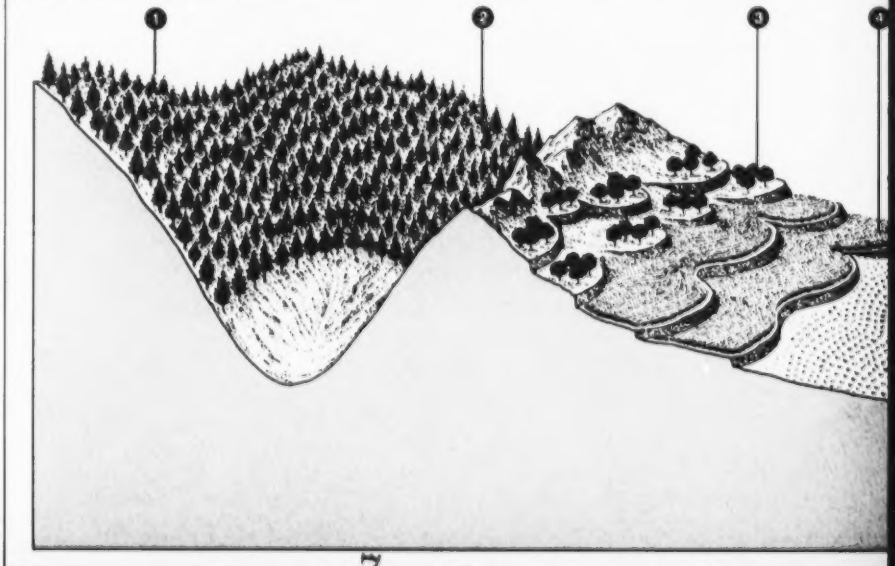
Why the battle is being lost

Unhappily, although these are substantial achievements, they compare poorly to the rate of damage. The battle to protect the Earth from desertification is not being won, and the goal of arresting desertification seems more distant now than it did in 1977, at the time of the UN Conference on Desertification (UNCOD). Why?

One reason is that the money to combat desertification has not been made available on the scale recommended at UNCOD. Furthermore, donors have tended to support projects only marginally connected with desertification, such as the provision of new roads, rather than the more difficult but less expensive projects of direct relevance. Often, they have proved unwilling to finance the recurrent costs of projects that are essential to their long-term success: trees may be planted and sand dunes stabilized but the effort is wasted without concrete provision to ensure that the trees are protected long enough to become established, and that the dunes are stabilized long enough for new vegetation to take root.

The affected countries, for their part, have failed to take the problem seriously enough. It cannot be solved piecemeal and without long-term commitment. One requirement is a national plan to combat desertification, and UNEP has been providing

Eight ways to prevent desertification



assistance to countries requesting help in making such plans. But few have asked for this help, and even fewer have actually prepared plans.

One that has is Tunisia. Thanks partly to help from UNEP, the country now has a national strategy to combat desertification, and a carefully itemized list of 21 priority projects to be completed by 1992. Covering areas such as the mapping of natural resources, agricultural development, research, training, and monitoring and assessment, these projects have attracted finance from several individual countries as well as from a number of international organizations.

The need for change

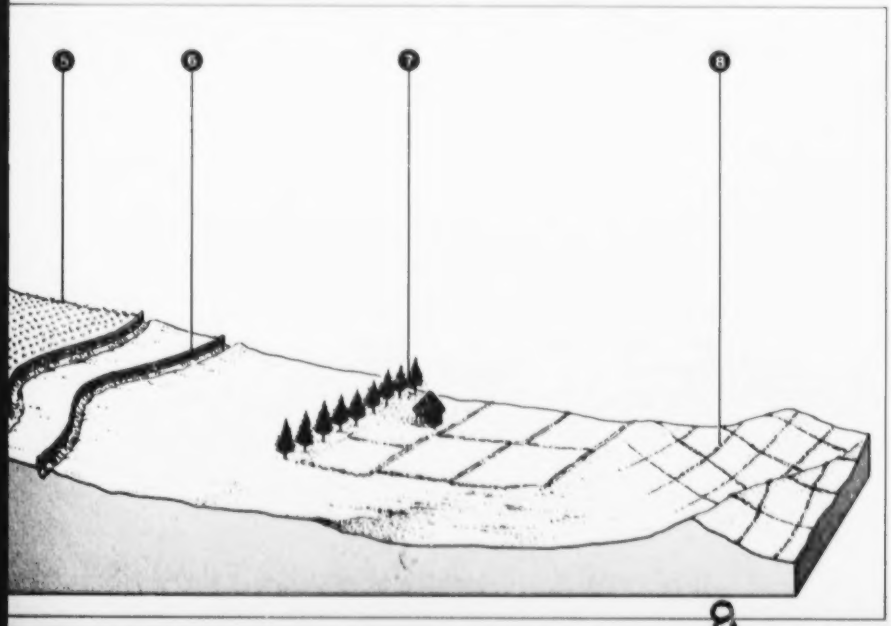
There is thus a case for a massive mobilization of resources to fight desertification. More people, and more governments, must be made aware of the severity of the threat if this is to happen. The affected countries will themselves have to take the issue more seriously than they have done in the past. Both donors and recipients of aid can, however, build on the lessons of the past decade, some of which are remarkably clear.

The first is that one pre-condition for success in field projects is community participation. Projects in which the people themselves plan and run their own

self-help schemes, on a small scale, have a much greater chance of success than large projects directed by distant bureaucrats.

Secondly, the non-governmental organizations (NGOs), particularly local ones, have had a remarkably successful track record in desertification projects. They have succeeded, for example, in getting trees planted in the Sahel where other, much larger projects have failed. The NGOs deserve all the encouragement and support they can get. On the other hand, the fact that the scale of their activities *is* small means that they alone could never hope to make more than a small dent in the overwhelmingly huge problem of global desertification.

It is easy to lose sight of the dimensions of the problem: an area the size of North and South America combined is involved, with a population of 850 million people, about one-fifth of the global population. Between half and a quarter of this land is already seriously affected; its productivity, in other words, has fallen by at least 25 percent. NGOs may well be able to show the way but they alone are unlikely to win the battle.



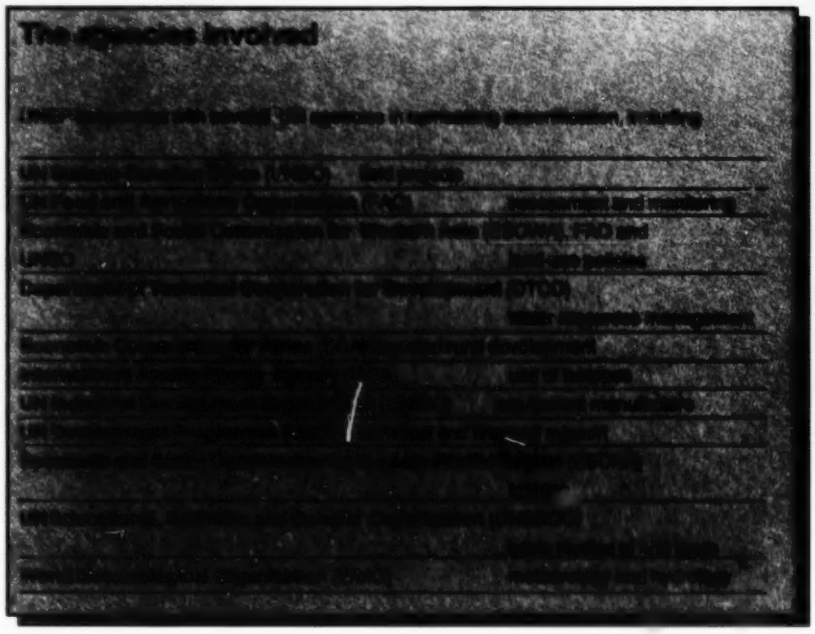
1. reforestation projects
2. plant trees along gullies
3. grow tree crops on eyebrow terraces
4. terrace steep land
5. cultivate along the contour
6. build bunds to control the run-off of surface water
7. plant shelter belts and windbreaks
8. stabilize sand dunes

How UNEP is helping

The United Nations Environment Programme is a catalysing, not an implementing, agency. Its role in combatting desertification, as in other areas, is to create awareness of the problem, help formulate strategy and coordinate UN action.

UNEP was designated the agency to coordinate the UN Plan of Action to Combat Desertification which was formulated at UNCOD in 1977. It does this through the Inter-Agency Working Group on Desertification and by working with other bodies, such as the Consultative Group for Desertification Control, to mobilize support for desertification projects.

Most activities are carried out in conjunction with other agencies (*see box*). Creation of greater public awareness of the issues is a job to which UNEP itself has paid particular attention. It has organized press visits to affected areas, helped finance an Earthscan press briefing guide on the subject, and supported a number of documentary films and filmstrips. These include the UNEP/Central Independent Television film *Seeds of Despair* that gave the outside world its first glimpse of the famine in Ethiopia, and the sequel *Seeds of Hope*, a six part series on land degradation and its solutions.



To promote awareness at the grass roots level, UNEP has supported NGOs in several regions and is helping create networks of NGOs involved in combatting desertification in Africa and Asia.

UNEP's new 'concentration' programme is aimed at concentrating resources on a few needy countries and thus enabling them to reach the breakthrough stage at which desertification becomes a permanent feature on the national agenda.

To learn more ...

More detailed accounts of the issues discussed in this publication can be found in:

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Text and lay-out: Robin Clarke
Design and artwork: Chapman, Bounford and Associates